UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
BIN C15700
Seattle, WA 98115-0070

NMFS Tracking No.:
2003/00653

April 7, 2004

Magalie R. Salas
Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, D.C. 20426

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for Northwest Pipeline Corporation, White River Replacement Project, White River, Near River Mile 10.8, King County, Washington (Docket No. CP03-032-000) (HUC 17110014)

Dear Ms. Salas:

Enclosed is a document containing a biological opinion (Opinion) prepared by NOAA's National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) on the effects of the proposed pipeline replacement and bank restoration project, on the White River, near River Mile 10.8, King County, Washington (Docket No. CP03-032-000). In this Opinion, NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of ESA-listed Puget Sound chinook (*Oncorhynchus tshawytscha*). As required by section 7 of the ESA, NOAA Fisheries includes reasonable and prudent measures with nondiscretionary terms and conditions that NOAA Fisheries believes are necessary to minimize the impact of incidental take associated with this action.

This document contains a consultation on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and its implementing regulations (50 CFR Part 600). NOAA Fisheries concludes that the proposed action would not adversely effect designated EFH for coho (*O. kisutch*), pink (*O. gorbuscha*) and chinook salmon. As required by section 305(b)(4)(A) of the MSA, included are conservation recommendations that NOAA Fisheries believes will avoid, minimize, mitigate, or otherwise offset adverse effects on EFH resulting from the proposed action. As described in the enclosed consultation, 305(b)(4)(B) of the MSA requires that a Federal action agency must provide a detailed response in writing within 30 days of receiving an EFH conservation recommendation.

If you have any questions regarding this letter, please contact Thom Hooper of my staff in the Washington Branch Office at 360-753-9453.

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

Enclosure

Endangered Species Act - Section 7 Consultation
and
Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation

Northwest Pipeline Corporation
White River Replacement Project
King County, Washington

Agency:	Federal Energy Regulatory Commission
Consultation Conducted by:	National Marine Fisheries Service, Northwest Region
Date Issued:	April 7, 2004
Issued by:	for Michael R Crouse D. Robert Lohn Regional Administrator
NMFS Tracking No.	2003/00653

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1.0 INTRODUCTION

This Biological Opinion (Opinion) and Essential Fish Habitat (EFH) consultation responds to a request by the Federal Energy Regulatory Commission (FERC) to initiate consultation on their authorization of Northwest Pipeline (Northwest) Corporation's White River replacement project. The FERC's Office of Energy Projects proposes to issue Northwest (a subsidiary of Williams, and PG&E Gas Transmission, Northwest) a Certificate of Public Convenience and Necessity for the project. Before issuing the approval, FERC has requested consultation with NOAA's National Marine Fisheries Service (NOAA Fisheries) under the Endangered Species Act (ESA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The project is within the geographic range of the Puget Sound (PS) chinook salmon (*Onchorynchus tshawytscha*) Evolutionarily Significant Unit (ESU) and contains EFH for chinook, coho *(O. kisutch),* and PS pink *(O. gorbuscha)* salmon.

The purpose of Northwest's project is to replace approximately 4,300 feet of parallel natural gas pipelines crossing the White River, its floodplain, and the adjacent north slope. These 26- and 30-inch diameter pipelines cross the White River at about river mile (RM) 10.8. The White River 4th-field Hydrologic Unit Code is 17110014. A shallow installation depth and river scour have increased the risk of damage to the pipelines. Northwest intends to replace the pipelines deeper below the river surface, remove an exposed portion of abandoned pipeline from the White River, and remove the pipeline protection structures that were previously installed on the north and south banks.

This document constitutes NOAA Fisheries' opinion of FERC's proposed authorization and the subsequent construction of the project by Northwest on ESA-threatened PS chinook and EFH for salmon, and is based upon the best scientific and commercial information available. Information in this document is incorporated from the Environmental Assessment ([EA] FERC 2003), the Geomorphological Report (Golder Associates 2003), other supporting documents and supplementary information detailed below.

1.1 Consultation History

On October 1, 2002, NOAA Fisheries met with representatives of Northwest and their consultants, the Washington Departments of Ecology and Fish and Wildlife, the Muckleshoot Indian Tribe, the COE, U.S. Fish and Wildlife Service (FWS), and others to discuss the proposed project.

On November 15, 2002, representatives of Northwest met with NOAA Fisheries to discuss changes in the construction schedule, and potential impacts of the project.

On February 27, 2003, NOAA Fisheries received a copy of the geomorphological report for the project (Golder Associates 2003).

On May 23, 2003, NOAA Fisheries received a copy of the EA, biological assessment (BA), and a request to initiate consultation on Northwest's White River replacement project.

On June 13, 2003, NOAA Fisheries sent a letter to FERC and Northwest acknowledging the receipt of the request and initiation of the consultation.

On July 25, 2003, NOAA Fisheries received a copy of the Muckleshoot Indian Tribe's comments to FERC on the project (letter dated June 17, 2003).

1.2 Description of the Proposed Action

The action proposed by FERC is the issuance of a Certificate of Public Convenience and Necessity to Northwest for the removal, abandonment, and replacement of natural gas pipelines crossing the White River within the Muckleshoot Indian Reservation and King County. This certificate would be issued to Northwest pursuant to the Natural Gas Act of 1938, and is necessary to authorize work to protect the pipeline, remove a portion of exposed and abandoned pipeline, and reestablish functional floodplain north and south of the river.

Floodplain restoration will occur through the removal of two bank protection structures, one each on the north and south banks. The north bank structure, which consists of riprap and fill, was installed in 1996. In 1999, sheet pile was installed on the south bank. The north bank structure is beginning to deteriorate, increasing the risk of pipeline exposure through erosion. The north bank structure was installed under the COE's condition that Northwest would seek a permanent solution to protecting the pipelines and maintaining functional floodplain. This project intends to fulfill that condition through the removal of both bank protection structures and the restoration of functional floodplain conditions.

Removal of the bank protection structures while minimizing risk to the pipelines necessitates that Northwest replace a section of the pipelines deep below the river. To achieve this, Northwest intends to replace 1,200 feet of pipeline in the floodplain and uplands by open trenching, and 3,200 feet under the White River and portions of the floodplain and northern uplands using a horizontal directional drill (HDD). A portion of the pipeline would be abandoned in place, exposed pipeline in the river would be removed, the bank protection structures be removed, and large wood will be placed in-river to create habitat complexity for salmonids.

Construction of the proposed project includes clearing, grading, ditching, stringing, bending, welding, installing, backfilling, hydrostatic testing, cleanup and restoration. Construction would begin in June 2004 with the HDD installation of the replacement pipelines (FERC 2003; T. Schwalbe, email, June 20, 2003). Installation of the HDD pipelines is expected to be complete by October 2004, and the remainder of the project construction would occur in 2005, from April to August. The project includes a Spill Prevention, Containment, and Countermeasure Plan (SPCC), a Groundwater Monitoring and Mitigation Plan (GMM), Riparian Management Plan, North Bank Grading Plan, Mitigation Plan for Potential Impact to Riparian Zones, Wetlands and

Fish, and Long-Term Habitat Monitoring Plan.

1.2.1 Pipeline Installation

An HDD would be used to drill underneath the White River and major roadways to the north. The proposal includes setting the HDD equipment rig on the south floodplain, about 600 feet from the south bank of the White River. First, a pilot hole would be cut that crosses northward underneath the White River and exits in an upland area, nearly half a mile away from the White River. Cutting of the pilot hole (approximately 10 inches diameter) would provide the contractor with data to determine the geotechnical conditions along the drill pathway, and the appropriate hole-opening techniques. Upon completing the pilot hole, multiple passes would be made to increase the diameter of the hole until the proper diameter is achieved for pipe installation. At the north end of the project, an exit hole would be excavated, and Northwest would pre-assemble pipeline segments in this northern work area before pulling them southward through the HDD exit hole and under the river. According to Northwest, the HDD would pass 70 feet under the bottom of the White River channel and there would be 20 feet of horizontal separation between the two pipelines.

During drilling, mud and water are pumped through the drill pipe to aid the motor assembly in cutting the soil and rock. The drilling fluid also helps lubricate the drill stem, carry cuttings to the surface, and prevent collapse of the hole. Because the elevation difference between the entrance and exit holes is about 200 feet, drilling fluid would flow to the south floodplain where Northwest will construct a mud pit (150 feet by 460 feet) to contain the fluid. The maximum depth of the pit would be 3 feet, and may be less depending upon the depth of groundwater. An additional 25 feet around the perimeter of the pit is needed for spoils, which may reach a height of about 6 feet. According to Advantage Professional Services, Inc. (2002), the spoil pile will act as a berm and increase the containment capacity of the mud pit by adding another 2 feet to the containment depth. Advantage Professional Services, Inc. estimates the combined capacity at about 200,000 cubic feet. The drilling fluid (largely bentonite clay) is expected to form a natural impervious layer to prevent hydraulic connectivity with subsurface waters. Mud will be pumped from the pit and disposed of in accordance with state and local regulations.

The HDD replacement line will be hydrostatically tested before and after installation. Hydrostatic testing before installation would occur within an upland pasture to the north. After the pipeline is installed test water would be discharged onto the south floodplain. For each test, the 26-inch pipeline and the 30-inch pipeline require 110,000 and 150,000 gallons of water, respectively.

In 2005, Northwest would install about 850 feet of replacement pipeline in the south floodplain by open trenching. The trench would be excavated to a depth of 23 feet to prevent scouring by the White River. Trench supports would be used to minimize the trench width, which would be about 20 feet at its base. These replacement pipelines would tie into the lines replaced by HDD in 2004 and the end points of the undisturbed lines approaching from the south. When the replacement lines are installed in the south floodplain and tied-into the existing lines, then

Northwest would remove the replaced pipeline in the south floodplain by excavation.

1.2.2 Pipeline Removal

The replaced pipelines in the south floodplain and along the north slope would be removed by excavation. For the south floodplain portion, the replaced pipeline would be removed to within about 75 feet of the White River's south bank. The north bank pipeline would be removed in sections, and portions would be abandoned in place. Pipelines would not be removed from underneath the channel because they were previously buried to a 20-foot depth, which Northwest has determined should be a sufficient depth to avoid scour.

The previously abandoned 26-inch pipeline that crosses the White River, which is mostly exposed, would be removed and lifted onto the gravel deposit between the braided reaches. Northwest expects that excavation may be necessary on and adjacent to the island. To access the exposed pipeline, Northwest would cross the White River with heavy equipment. Three temporary, single span, prefabricated bridges would be installed to move equipment and spoils across "Wetland 1" (as described in the Environmental Assessment), and the White River. A track-hoe would make one inwater crossing to aid in the placement, securing, and removal of each bridge before any equipment could cross on the top of the bridges. The temporary equipment bridges would likely consist of flat railroad cars cut to length with concrete supports on each end. Due to their length, two bridges would likely require an additional temporary support set in the river. The bridges would be installed with geotextile mats stretched in awning fashion over the water to prevent spoils from spilling into the river.

1.2.3 Restoration and Monitoring

Once the pipelines in the south floodplain are removed, Northwest would remove the sheet pile along the left bank. Some excavation (about 2 to 3 feet) may be necessary to expose the top of the sheet pile and fasten the clamps for its removal. Northwest intends to pull the sheet pile out vertically, one section at a time, avoiding work within the wetted channel.

In total, the project requires about 30 acres of work areas. About 12 acres includes disturbance on existing pasture lands. Northwest expects that vegetation clearing within the floodplain would occur on 11.4 acres (7.2 acres in 2004 and an additional 4.2 acres in 2005). About one acre of mixed floodplain forest would be permanently lost when it is converted to new permanent right-of-way, while on about three acres of existing right of way vegetation would be allowed to grow.

Northwest will plant vegetation to permanently stabilize work areas disturbed in 2004 that are only required for construction that year. Areas disturbed in 2004 that will be used in 2005 will be stabilized by temporary seeding and mulching, and will be permanently stabilized upon completion of the project the following year as described in their re-vegetation plan.

In order to determine the success of the restoration and mitigation measures (discussed below), Northwest would perform long-term monitoring of the riverbank edges, channel characteristics, large woody debris (LWD), and the adjacent floodplain according to its Long-Term Habitat Monitoring Plan. Northwest proposes to provide a baseline report to NOAA Fisheries for the first 5 years following construction completion. The monitoring would document the progress of the restoration and allow for opportunities to repair any LWD habitat enhancement structures that have not progressed adequately.

1.2.4 Proposed Mitigation Measures

Proposed mitigation measures to reduce, eliminate, or offset any adverse impact and incidental take of PS chinook include: (1) minimizing or avoiding impact to in-stream habitats and to riparian vegetation; (2) restoring or enhancing long-term riparian vegetation; and (3) restoring or enhancing in-stream habitat and channel development for the White River.

1.2.4.1 Minimizing In-Stream and Riparian Activities

Northwest has identified and will utilize construction timing and procedures to minimize the area and duration of in-stream construction and resulting turbidity. Northwest plans to use HDDs and equipment bridges to limit in-stream activities where possible. Construction scheduled over 2 years eliminates the need to disturb additional floodplain habitat and clear additional trees as the same construction work areas will be reused. Minimizing in-stream work and riparian disturbances is meant to reduce disturbing fish directly and limit reductions in properly functioning conditions of fish habitat.

1.2.4.2 Restoring Riparian Areas

Northwest will restore the floodplain, north river bank, and north slope. Revegetation will promote establishment of original vegetative cover types and densities. Northwest will replant 3 year-old conifers (Douglas fir and western red cedar) at a density of 436 stems per acre. Over the long-term, the trees will provide shade, detrital and invertebrate inputs into the river. The river banks will be re-planted with native species as discussed in the "Riparian Mitigation Plan."

Riparian vegetation is important to properly functioning fish habitat. To reduce or eliminate indirect effects to riparian vegetation on the south floodplain, principally by human disturbances during revegetation efforts, Northwest would limit access to the south floodplain by constructing barriers. Northwest will use boulders, riprap and LWD salvaged from the north bank structure as well as trees cleared where constructing the access road. Northwest will also construct a security gate on the south floodplain. This gate will limit access and reduce indirect effects to vegetation as well as to fish and fish habitat.

1.2.4.3 Restoring In-Stream Habitat and Channel

Northwest intends to mitigate impacts on in-stream habitat by: (1) restoring the north bank in such a way as to allow the floodplain to properly function there, (2) placing pieces of LWD and woody debris structures on-site to provide fish habitat, (3) performing off-site mitigation within the area of dispersed affect (the area of the channel upstream and downstream of the project), and (4) long-term monitoring of riverbank edges, channel characteristics, LWD, and the adjacent floodplain.

1.3 Description of the Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area for this project extends from RM 11.2 to 10.4 of the White River. The extent of the action area is defined by the effects of channel changes that would potentially occur after removing the exposed abandoned pipeline. The action area extends onto the floodplain, (north and south) and up the north slope of the White River at the construction site to include all temporary work areas and temporary access roads. These areas are well documented in the Environmental Assessment and in the draft BA. This definition of the action area is based on the biotic, physical, and chemical effects of the action on the environment.

2.0 ENDANGERED SPECIES ACT

2.1 Biological Opinion

The ESA of 1973 (16 U.S.C. 1531-1544), as amended, establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with NOAA Fisheries and FWS to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or to adversely modify or destroy their designated critical habitats.

This document is a product of an interagency consultation pursuant to section 7(a)(2) of the ESA and its implementing regulations found at 50 CFR Part 402. The objective of this consultation is to determine whether the FERC's proposed authorization and the subsequent construction of the project by Northwest for the replacement of their pipeline crossing the White River, the removal of the north bank structure, abandoned 26-inch pipeline, and south bank sheet pile is likely to jeopardize the continued existence of PS chinook salmon. Since critical habitat for this ESU was vacated pursuant to a consent decree (National Association of Homebuilders *et al.* v. Evans, Civil Action No. 00-2799 [CKK] [D.D.C., April 30, 2002]), this document does not include a critical habitat analysis.

2.1.1 Status of the Species

NOAA Fisheries completed a status review of chinook salmon from Washington, Idaho, Oregon, and California in 1998, which identified fifteen distinct ESUs of chinook salmon in the region (Myers *et al.* 1998). After assessing information concerning chinook salmon abundance, distribution, population trends, risks, and protection efforts, NOAA Fisheries determined that chinook salmon in the PS ESU are at risk of becoming endangered in the foreseeable future. Subsequently, NOAA Fisheries listed PS chinook salmon as threatened on March 24, 1999 (March 1999, 64 FR 14308). This listing extends to all naturally spawning chinook salmon populations residing below natural barriers (e.g., long-standing, natural waterfalls) in the PS region from the North Fork Nooksack River to the Elwha River on the Olympic Peninsula, inclusive.

The PS ESU is a complex of many individual populations of naturally spawning chinook salmon, and 42 hatchery populations (March 1999, 64 FR 14308). Recently, the Puget Sound Technical Recovery Team (PSTRT), an independent scientific body convened by NOAA Fisheries to develop technical delisting criteria and guidance for salmon delisting in Puget Sound, identified 22 geographically distinct populations of chinook salmon in the PS ESU including one in the White River (PSTRT 2001, 2002; BRT 2003). These population designations are preliminary and may be revised based on additional information or findings of the PSTRT. Through the recovery planning process, NOAA Fisheries will define how many and which naturally spawning populations of chinook salmon are necessary for the recovery of the ESU as a whole (McElhany *et al.* 2000). At this time, only five hatchery stocks are considered essential to the recovery of PS chinook salmon. The listed hatchery stocks are: Kendall Creek (spring run), North Fork Stillaguamish River (summer run), White River (spring run), Dungeness River (spring run), and Elwha River (fall run) (March 1999, 64 FR 14308).

In most streams within Puget Sound, both short- and long-term trends in chinook salmon abundance are declining. Overall abundance of chinook salmon in this ESU has declined substantially from historical levels and many populations are small enough that genetic and demographic risks are high. An updated assessment of the status of the ESU indicates that about half of the populations are declining and half are increasing in abundance based on long-term trends in abundance and median population growth rates (BRT 2003). The conclusion of the BRT after the updated assessment was that this ESU remains likely to become endangered. The BRT were particularly concerned that the concentration of the majority of natural production occurs in just two basins, hatchery production has been very high, and widespread losses of estuarine and lower floodplain habitat diversity have occurred within the ESU (BRT 2003).

Genetic diversity and fitness of naturally spawning populations may be severely reduced through the widespread influence of hatchery populations. According to Myers *et al.* (1998) nearly 2 billion fish have been released into Puget Sound tributaries since the 1950s, many of which consisted of interbasin transfers of Green River hatchery fish (Marshall *et al.* 1995).

Harvest impacts on PS chinook salmon stocks have been quite high in the past. Total exploitation rates averaged 75% based on the earliest data available (BRT 2003). Fifteen of the 22 independent populations had average exploitation rates greater than 75%, while exploitation of four populations was greater than 90%. Recent data indicates that the average exploitation rate for the ESU is 44% (BRT 2003).

Migratory blockages and degradation of freshwater habitat have contributed to reduced abundances in this ESU. Widespread agriculture, urbanization, and forest harvest have significantly altered the complexity of freshwater and estuarine habitats used by chinook salmon. Diking, dredging, and other forms of hydromodification have diminished the amount of side-channel and slough habitat available for rearing and spawning. Spring- and summer-run chinook salmon populations throughout the PS ESU have been particularly affected. These life histories have exhibited widespread declines throughout the ESU and some runs are considered extirpated (Nehlsen *et al.* 1991; March 1999, 64 FR 14308, PSTRT 2002). These losses represent a significant reduction in the life history diversity of this ESU (Myers *et al.* 1998; March 1999, 64 FR 14308).

2.1.2 Evaluating the Proposed Action

The standards for determining jeopardy are set forth in 50 CFR 402 (the interagency consultation regulations). In conducting this analysis, NOAA Fisheries first considers (1) the biological requirements of the listed species, and then (2) evaluates the relevance of the environmental baseline to the species' current status. Subsequently, NOAA Fisheries determines if after the proposed action is complete the species would be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of injury and mortality attributed to: (1) the collective effects of the proposed or continuing action, (2) the environmental baseline, and (3) any cumulative effects within the action area. This evaluation must take into account measures for survival and recovery specific to the listed salmon’s life stages that occur beyond the action area. If the action is found likely to jeopardize, then NOAA Fisheries would identify reasonable and prudent alternatives for the action.

2.1.2.1 Biological Requirements

The first step in the ESA section 7(a)(2) analysis is to define the species’ biological requirements that are most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species taking into account population size, trends, distribution, and genetic diversity. To assess the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list PS chinook salmon for ESA protection and also considers new data available that are relevant to the determination.

Relevant biological requirements are those conditions necessary for the PS chinook salmon ESU to survive and recover to naturally reproducing population levels, at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment (McElhany *et al.* 2000). The biological requirements of chinook salmon include food, flowing water (quantity), high quality water (cool, free of pollutants, high dissolved oxygen concentrations, low sediment content), abundant clean spawning substrates, and unimpeded migratory access to and from spawning and rearing areas (adapted from Spence *et al.* 1996). The biological requirements of PS chinook that are likely to be affected by the project include water quality, cover/shelter, food, spawning substrates, riparian vegetation, and access.

2.1.2.2 Status of the Species in the Action Area

Recently, the PSTRT (2001) delineated one independent population of chinook salmon within the White River. Both hatchery and naturally spawning White River fish are protected under the ESA because this hatchery stock is one of the five hatchery stocks essential to the recovery of the PS ESU. The population is believed to contain both spring and summer/fall runs. For the most part, the primary means of discerning between the two runs has been according to the timing of their arrival at the COE's Buckley trap (RM 24.3). Those fish that arrived before August 15 were classified as spring chinook and those that arrived later were considered part of the summer/fall run. Recent DNA analyses conducted by Washington Department of Fish and Wildlife (WDFW) suggests that the spring and fall stocks are genetically distinct stocks (Shaklee and Young 2002). The spring run is also genetically unique and comprises the last existing spring chinook salmon stock in South Puget Sound.

Hatchery influence on this stock has been extensive. In the early 1970s, an artificial propagation program was established for White River spring chinook salmon because returns were critically low (WDFW *et al.* 1996). The artificial propagation program was initially started to restore the south Puget Sound fishery, and by the late 1970s, NOAA Fisheries was working cooperatively with WDFW and the Muckleshoot and Puyallup Indian Tribes to avoid extinction of the stock (WDFW *et al.* 1996). It would be difficult, as a result of the changes the population has undergone, to know how the historic genetic makeup of the chinook may compare to what constitutes this run today. Since the White River historically flowed through the Green and Duwamish River and now flows through the Puyallup, the distinctness of the fall run may be influenced by Puyallup River, Green River and Green River-origin hatchery fish, and late White River fish or some combination of these (J.Myers, pers. comm., April 28, 2003). It is not clear, however, that White River chinook salmon possess sufficient remaining resilience to survive and recover in the absence of augmentation through artificial production (T. Tynan, pers. comm., NOAA 2002).

Counts of adult chinook salmon in the White River dropped precipitously from the earliest counts at the Buckley trap to a critical low in the 1970s (WDFW *et al.* 1996). The Buckley trapping effort provides the longest data set available on White River chinook salmon (Figure 2-1). Trap and haul operations began in 1940 and counts of fish returning to the trap began in 1941. Chinook salmon returning to the trap averaged 2,800 annually, ranging from 1,200 to almost 5,500 in the first decade of operation[1] (WDFW *et al.* 1996; Ladley *et al.* 1999).

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[1]WDFW *et al.* (1996) suggested that these early returns were already depressed as a result of "unmitigated" hydropower operations since 1911.

Counts declined steadily until about 50 chinook salmon returned in 1977, and in 1986 only eight fish (six adults and two jacks) were passed above the dam (COE, Seattle District, *unpubl. data* 2001; WDFW *et al.* 1996; Ladley *et al.* 1999).

In 1991, Nehlsen *et al.* identified the White River spring run as having a moderate risk of extinction and in 1999, NOAA Fisheries listed the White River spring-run as one of only five hatchery populations essential for the recovery of the PS ESU (March 1999, 64 FR 14308). The decline of the stock is attributed to the additive, cumulative, and synergistic effects of intense human activities (Ladley *et al.* 1999). Harvest and habitat constraints, specifically, flow regime, sedimentation, streambed instability, estuarine loss, reduced LWD volumes, and passage problems associated with dams affect White River chinook salmon, threatening the long-term viability of the population (Bishop and Morgan 1996). These and other threats to White River chinook salmon are described below, under *The Environmental Baseline.*

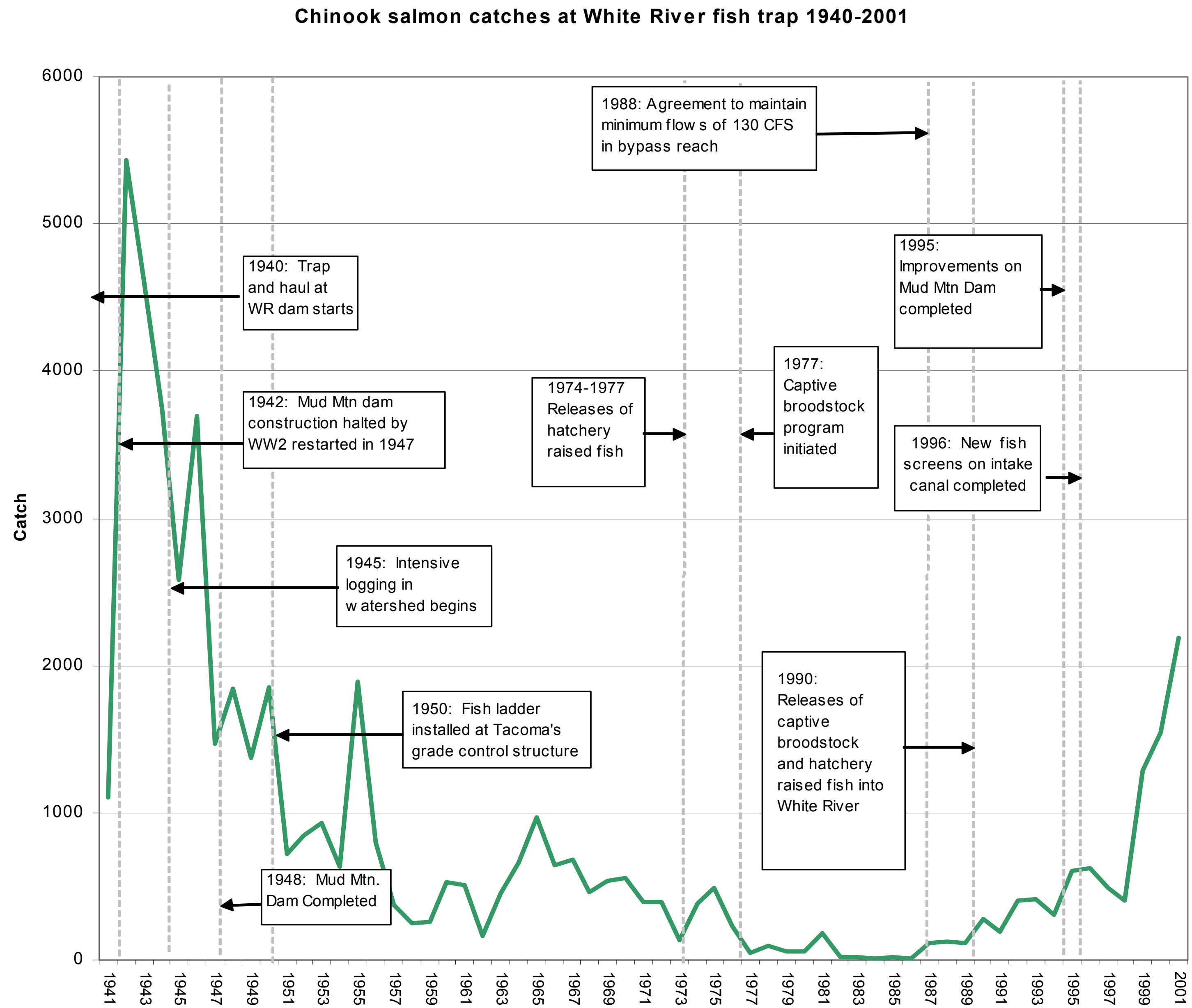

Figure 2-1. Chinook salmon captured at the Buckley trap from 1940-2001.

Data suggest that the White River stock is responding to recent management efforts to increase returns, which have included reduced harvest, modifications to Mud Mountain Dam, the installation of screens at the Puget Sound Energy (PSE) diversion, increased flows in the bypass reach, and the release of over 2,000,000 hatchery chinook between 1992 and 1999. The PSTRT (2002) has not yet issued population viability planning ranges for the White River population. However, in 1996, WDFW *et al.* established an interim recovery goal of passing 1,000 natural spawners above Mud Mountain Dam for “three out of the four consecutive years with the normal level of incidental sport, commercial and tribal harvest.” The number of spawners passed above

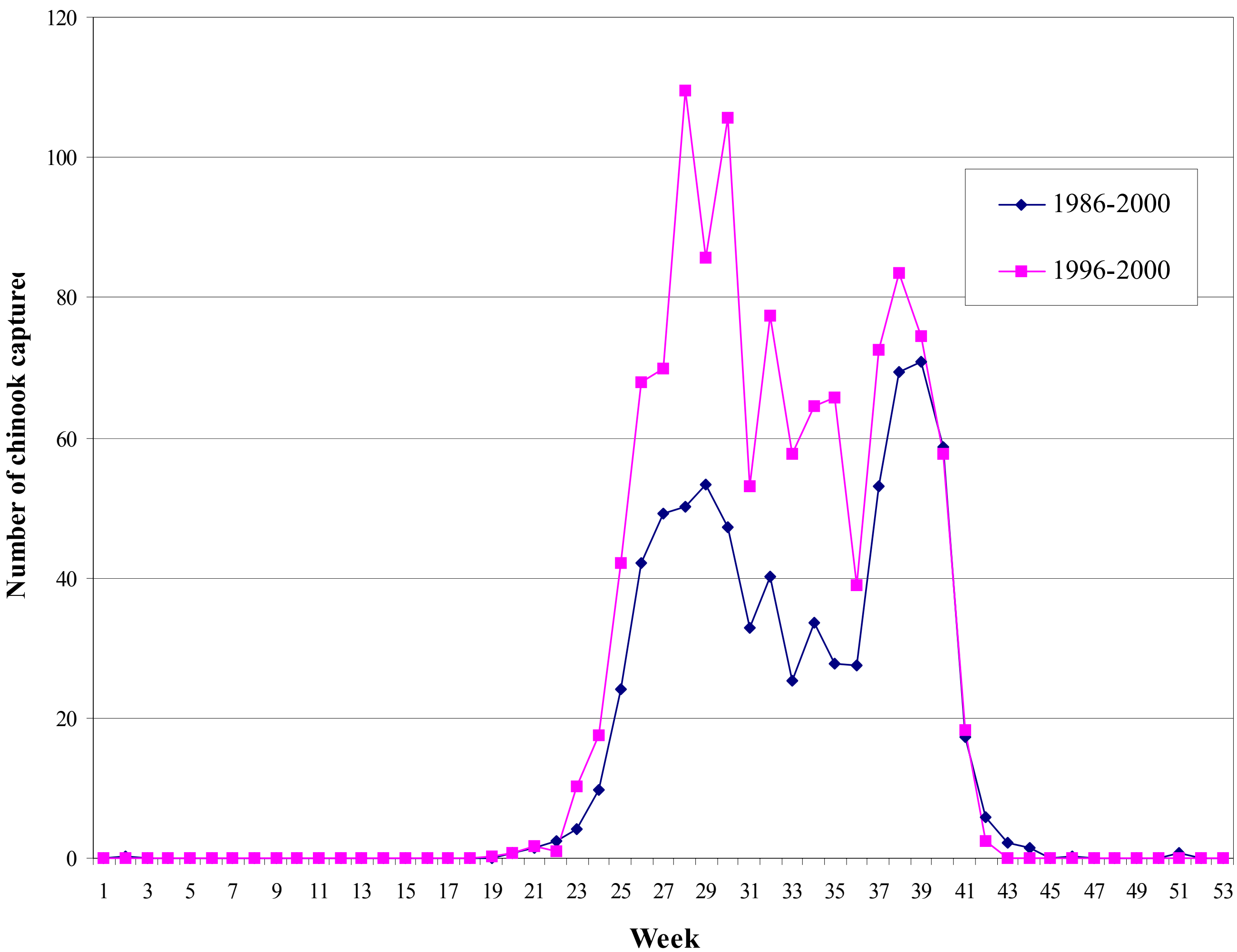

Figure 6 Weekly chinook salmon returns to Buckley

Mud Mountain Dam has exceeded 1,000 three times in recent years (1999, 2000, and 2001), while the five-year geometric mean of recent natural spawners is 735 chinook salmon (BRT 2003).

The vast majority of adult chinook salmon enter the White River between June and October. However, chinook salmon were typically encountered at the Buckley trap from May through August, with peak returns in June between 1942 and 1950 (WDFW *et al.* 1996; Ladley *et al.* 1999). Currently, chinook salmon exhibit a bimodal return to the Buckley trap (See Figure 2-2). The peak number of chinook salmon returning to the Buckley trap, according to average weekly returns between 1986 and 2000, occurs first in July, and then again at the end of September (data are for total chinook catch at Buckley, which includes hatchery fish) (COE, Seattle District, *unpubl. data*). For the 10-year period considered, the second peak (September) was higher, but more recently (1996 to 2000) returns have been higher during July (COE, Seattle District, *unpubl. data*).

According to chinook salmon returns to Buckley from 1990 to 2002, it appears that the majority of the White River chinook salmon population will migrate through the action area during the proposed construction period. For the most part, however, work would be conducted outside and below the wetted channel with the exception of about two days to remove the exposed pipeline from the White River channel.

During their upstream migration, chinook salmon will generally hold in deep pool habitat, particularly during extended periods before spawning. Deep pool habitat provides important resting areas to migrants and can also provide thermal relief from warm water in the mainstem White River. Ladley *et al.* (1999), however, did not observe chinook salmon holding exclusively in pools during their telemetry study, which may be, in part, a result of poor pool quality (insufficient pool depths and cover) in the White River.

The majority of White River chinook salmon spawning occurs upstream of the action area in four major non-glacial tributaries in the upper watershed: Boise Creek (RM 23.9), Clearwater River (RM 35.3), Greenwater River (RM 45.8), and Huckleberry Creek (RM 53.1) (Ladley *et al.* 1999; Williams *et al.* 1975). Peak spawning in tributaries above the Mud Mountain Dam occurs about mid-September, roughly 8 weeks after peak returns to the Buckley trap (Ladley *et al.* 1999).

For the mainstem White River, information on chinook salmon spawning is limited, largely by visibility. Surveys for adult chinook salmon below the PSE diversion have been conducted annually by the Puyallup Tribal Fisheries Department (PTFD, *unpub. data*) since 1995. These surveys typically began at the diversion (RM 24.3) and terminated at the Eighth Street Bridge (RM 7.5). Annual redd counts in this reach for the years 1995 to 2001 have ranged from 0 to 99, with an average of 36 redds for the seven years considered. According to fish surveys conducted by the Muckleshoot Indian Tribe between RM 8.9 and 15.5, the density of chinook salmon spawning is much higher in side channels than in the mainstem (Malcom and Fritz 1999). Of the 80 chinook salmon redds counted by Malcom and Fritz (1999), only seven redds (nine percent) were recorded within the mainstem White River. Malcom and Fritz (1999) surmised, based on observations during their study and previous observations, that spawning in side channels is a typical behavior for White River chinook salmon. Thus, the actual number of chinook salmon spawning in the action area may be considerably higher than the PTFD data suggests, as these surveys are typically conducted by boat and only infrequently include side channel habitats.

The action area is within what is known as the "Reservation Reach" of the White River. Malcom and Fritz (1999) found spring and fall chinook utilized habitats in the Reservation Reach of the White River for spawning, summer and winter rearing, or high flow refuge. It appears the bulk of spring chinook spawn above the Reservation Reach (above the action area), while the bulk of fall chinook spawn within the Reservation Reach, and the Reservation Reach supports a large percentage of the total chinook spawning in the White River. As stated above, studies by the Malcom and Fritz (1999), and the PTFD (*unpub. data*), found chinook used both the mainstem and side channels for spawning, but spawning densities were higher in the side channels where redds were typically found in the downstream portions.

After incubation, fry emerge from the gravel from late winter to early spring. Juvenile chinook salmon may then migrate downstream to rear in low-gradient channels (WDFW *et al.* 1996). The majority (80%) of chinook salmon in the White River rear for short periods (one to three months) in fresh water, emigrating as subyearlings and the remainder (about 20%) emigrate as yearlings after rearing in fresh water for about one year (Dunston 1955). Scales collected from adult chinook salmon at the Buckley trap confirm age at migration (WDFW *et al.* 1996). Short periods of freshwater rearing may represent an adaptive response by juvenile chinook salmon to the naturally turbid waters of the White River. Characteristically high suspended sediment loads may affect timing and age of fish at out-migration by limiting rearing densities compared to what would be expected in a rain dominated (clear) river of comparable size (Ptolemy *in* Newcombe and Jensen 1996). In other basins, side channels fed by clear groundwater, and valley-wall runoff provide critical habitat and are extensively used by chinook salmon fry (Murray and Rosenau 1989; Chamberlin *et al.* 1991; Scrivener *et al.* 1994). Studies suggest that even nonnatal clear-water, low gradient tributaries are used by juvenile chinook salmon and that these habitat types provide juveniles an opportunity to maximize their growth and survival through increased feeding success (Murray and Rosenau 1989). Such habitat may be particularly important to those fish that migrate as yearlings.

2.1.2.3 Environmental Baseline

The environmental baseline represents the current set of conditions to which the effects of the proposed action are then added. Environmental baseline is defined as "the past and present impacts of all Federal, state, and private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or informal section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation process" (50 CFR 402.02).

The life history characteristics (e.g., migration timing) of White River chinook are an expression of genetics and also adaptation to the local glacial environment of the basin. White River chinook salmon have evolved in a basin with frequently shifting braided channels, silty waters, a history of infrequent large wildfires and major channel shifts between the Puyallup and Duwamish basins.

The headwaters of the White River, which originate at the termini of Winthrop, Emmons, and Fyingpan glaciers, are considered pristine where they have been protected since 1899 with the creation of Mt. Rainier National Park. The river drains a watershed of approximately 494 square miles to the confluence with the Puyallup River at about RM 10.4, entering south-central Puget Sound at Commencement Bay. The majority of this basin has undergone pronounced changes since European settlement began in the region, as early as 1850 (Williams *et al.* 1975; Kerwin 1999). Prior to 1906, the flow of the White River split into distributaries near Auburn, Washington, with varying volumes of the river (depending on the abundance and distribution of flood-born logjams) flowing northerly into the Green River (which drains into Elliot Bay near Seattle, Washington) and southwesterly via the Stuck River, and then to the Puyallup River. Flooding and human activities resulted in the entire flow of the White River flowing down the Stuck River channel in 1906. This route was later reinforced with permanent structures to prevent reconnection with the Green River.

The White River flows through a series of glacial deposits and the remains of the Osceola Mudflow, which covers the White River valley to a depth of 25 feet. The geologically recent mudflow of approximately 5,700 years ago characterizes the White River as a "young river." As such, it is still in the process of cutting a channel through the mudflows and is characterized by steep gradients, heavy sediment loads, and in places, a deeply incised channel. Several thousand to well over a million tons of sediment are delivered annually from the upper basin to lower gradient reaches, most of which is transported during winter storm events (WDFW *et al.* 1996; Kerwin 1999). Suspended sediment varies from 1 to 6,200 milligrams per liter with annual loads estimated, during a three year study, as ranging from 440,000 to 1,400,000 tons (Nelson 1979; WDFW *et al.* 1996).). Annual average transport above Mud Mountain Dam is estimated at 500,000 tons per year (Dunne 1986) and turbidity during summer months, July through September, ranges from 100 to 1000 Nephelometric Turbidity Units (NTUs) (Ladley *et al.* 1999). Glacial meltwater is the primary source of turbidity during summer months. Data collected by the Washington Department of Ecology (WDOE) in 1996 showed turbidity at the Sumner station (RM 4.9) ranged from 2 to 260 NTUs, and generally exceeded 25 NTUs during summer months (WDOE 2001). The name "White River" reflects the turbid appearance of the river caused by the high levels of suspended glacial sediments during the summer months.

In general, fine sediment affects the abundance and quality of spawning gravels, pool riffle ratios, water quality, survival to emergence, the delivery of organic materials, and can potentially affect fish access. Data reflect that most chinook in the White River appear to favor spawning in non-glacial tributaries, but this could be an artifact of how difficult it is to observe fish in the turbid mainstem. A freeze-core analysis of White River substrate below the PSE diversion concluded that based on visual inspection, "...it appeared that the amount of fines present in many of the cores could adversely affect incubation of eggs and or emergency of fry. However, the values of indices that were calculated generally did not fall in the range that would predict high mortality rates (Hosey and Associates 1989)." There are several other glacial rivers in the region that also carry high sediment loads, have channel instability, and have been substantial producers of chinook salmon (e.g., the Nooksack, Skagit, Hoh, and Queets Rivers, and others).

Dams and timber harvest practices have altered the timing and volume of sediment transport in the basin, and large woody debris (LWD) recruitment to the action area (WDFW *et al.* 1996). The White River basin outside the National Park has been intensely managed for timber harvest, particularly in the last 50 years. As a result, channel sinuosity is simplified, and pool abundance and quality is reduced (WDFW *et al.* 1996; Kerwin 1999). Active LWD removal further reduced debris loading in the action area.

Large woody debris tends to collect less frequently in large channels like the White River; however, when they do form, the log jams in rivers this size are usually quite massive. The LWD jams are generally a critical component of chinook salmon habitat through their influence on bed and bank scour, hydraulic complexity, side channel development, pool formation and stability, and bar and island formation (Montgomery *et al.* 1995; Spence *et al.* 1996). The LWD jams may also help maintain appropriate thermal gradients by inhibiting the mixing of cool water tributaries with mainstem reaches (Spence *et al.* 1996). For the action area, and in general within the White River basin, LWD is one factor that likely influences pool formation and frequency.

From RM 11.3 to RM 23.3, the White River is largely unconfined and is free to meander and migrate in response to flow. Between RM 23.33 and 24.3 two sets of old bridge abutments, and the PSE diversion tend to limit channel migration. The mainstem White River, from its confluence with the Puyallup River to the PSE diversion at Buckley (RM 24.3), has lost about seven percent of its channel length, whereas the lower Puyallup River, from its confluence with the White River to its mouth, has lost about 15% of its channel length since 1894-95 (Kerwin 1999). Since Mud Mountain Dam was constructed in 1942, active geomorphic surface area and length of side channels in the White River from RM 11.3 to 23.3 have been reduced by 56% and 35%, respectively (MITFD unpub. data; Ecocline 2000).

In general terms of instream flows, the White River basin is considered "over-appropriated" meaning there is not enough water to support users, maintain instream flows, and support healthy salmon runs (State of Washington 1999). Surface and groundwater withdrawals and an increase in impervious surfaces have affected flows in the White River and its tributaries (WDOE *et al.* 1995; Kerwin 1999). These changes have reduced the quantity and quality of chinook salmon habitat and accessibility, and are believed responsible for altering chinook salmon migration timing (Ladley *et al.* 1999). The bypass reach of the White River is occasionally a fully regulated river, often a partially regulated river, and sometimes an unregulated river. The regulatory mechanisms are PSE's diversion dam, the COE's Mud Mountain dam, and natural streamflow. As a consequence, fish habitat, particularly suitable juvenile rearing habitat, is quite literally a moving target between the low, regulated minimum instream flow of 130 cubic feet per second (cfs), intermediate flows, and much higher unregulated flows from 1,000 cfs up to 8,000 cfs. As flows increase, the main channel velocities increase, forcing many juvenile chinook salmon to seek refuge in protected side channels. Connectivity between the main and side channel habitat provides important refuge habitat. As described above, fish that move to these areas are likely not stranded when flows recede and return to the regulated minimum instream flows.

Mud Mountain Dam, operating since 1942, was authorized by the Flood Control Act of 1936 and was designed to attenuate flood flows. For nearly 50 years, the project attenuated floods greater than 2,000 cfs until pool levels reached the second tunnel. Today, the project has a total outlet capacity of 17,600 cfs (COE 2001).

A little more than five miles downstream of Mud Mountain Dam is PSE's hydroelectric project at Buckley (RM 24.3), which diverts a significant portion of the river's flow from about 21 miles of the mainstem White River. The Buckley water diversion was constructed in 1911 and has drastically reduced flows in the action area. Water is diverted at RM 24.3 and conveyed through a series of canals and settling basins to the Lake Tapps reservoir, then to the Dieringer Powerhouse for power generation, and returned to the White River at RM 3.5. In 1910, PSE was required by a Pierce County Superior Court to maintain a minimum flow of 30 cfs, although low flows in the bypass reach have ranged between zero cfs and 130 cfs (WDFW *et al.* 1996; Kerwin 1999). In 1986, an agreement was adopted between PSE and the Muckleshoot Indian Tribe that the project would maintain a minimum of 130 cfs within the bypass reach (WDFW *et al.* 1996). More recently, an agreement between the resource agencies and PSE (effective July 2001) resulted in minimum flows increasing to 350 cfs in April and May, and 250 cfs from June through October. Flows during November through January remain at 130 cfs, and increase to 200 and 275 cfs in February and March, respectively. Additional flow increases have been proposed in the consultation for the PSE project (NMFS draft Opinion 2002).

Operations of the diversion are restricted by license (the first of which was issued by the FERC in 1997 for minimum flows (130 cfs), ramping rates and the timing of scheduled outages (WDFW 2000). These requirements are intended to minimize the impacts of PSE's operations on fish within the basin. For instance, periodically (usually annually) PSE shuts off the diversion for maintenance reasons, at which time the river flows naturally through the bypassed reach. Abrupt changes in river flows have stranded fish in the bypassed reach as power generation turbines are brought on and off-line (WDFW *et al.* 1996). In the fall of 2000, PSE shut down the diversion for maintenance, which resulted in natural flows in the 21 miles of the bypass reach. Prior to the outage, flows in the bypass reach were about 275 cfs and during the outage ranged from 700 to 1,400 cfs (WDFW 2000). When the maintenance activities were complete and flows returned to the diversion, flows in the bypass reach fell sharply stranding over 750 fish in the north bank scour hole formed by Tacoma's dam.

On April 9, 2003, juvenile fish were observed dead and trapped from changes in mainstem flows in the bypassed reach. This incidence occurred as a result of the COE reducing flows at PSE's request to allow for the rebuilding of their diversion. The Puyallup and Muckleshoot Indian Tribes counted chinook, coho, and chum salmon among the fish that were killed, along with other species. Tens of thousands to hundreds of thousands of juvenile fish were believed to have been stranded throughout the 21-mile bypass reach when this activity has occurred; a large portion of which were chinook salmon fry (G. Sprague, email. April 24, 2003; S. Fransen, pers. comm., April 2003; R. Ladley, pers. comm. April, 2003).

Habitat access is also severely hampered by the two run of the river dams located within about

6 miles of each other (Mud Mountain, PSE's Buckley diversion). Therefore, as a result, habitat access is considered "not properly functioning" to the entire White River. Mud Mountain Dam and PSE's dam are total barriers to upstream migration (Kerwin 1999). To mitigate for the effect of these dams, a trap is located at PSE's diversion and fish captured there are hauled above Mud Mountain Dam.

Instream flows are only one of the water quality standards exceeded within the basin. The White River, listed as impaired under Section 303(d) of the Federal Clean Water Act, is in violation of the following standards within the action area: fecal coliform, mercury, copper, and instream flows (WDOE 2000). The basin, including the action area, is degraded by both the chemical contamination and high instream temperatures. High temperatures may increase the susceptibility of salmonids to infection, interfere with metabolism, and alter migration timing (Spence *et al.* 1996).

The habitat biological requirements of the PS ESU are not being met under the environmental baseline. Environmental baseline conditions in the action area would have to improve to meet those biological requirements not presently met. Further degradation or delay in improving these conditions might increase the amount of risk the listed ESU presently faces under the baseline.

2.1.3 Effects of the Proposed Action

NOAA Fisheries may use two approaches for assessing the effect of the proposed action (NMFS 1999). First, NOAA Fisheries may consider the impact in terms of the number of PS chinook salmon that will be killed or injured during a particular life stage and gauge the effects on the population size and viability. Alternatively, NOAA Fisheries may consider the effect of the proposed action on the freshwater biological requirements of the species, which is generally done in terms of the habitat attributes.

In this analysis, the probable direct and indirect effects of the action on the chinook salmon are identified. The ESA implementing regulations direct NOAA Fisheries to do so "together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR section 402.02)." Direct effects include those occurring at the project site and can extend upstream or downstream based on the potential for impairing fish passage, hydraulics, sediment and pollutant discharge, and the extent of riparian habitat modifications. Indirect effects are those effects that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Indirect effects can occur throughout the action area, and are used to help define the extent of the action area. Indirect effects may include changes in land use resulting from the construction of basic infrastructure needs that supports the development of undeveloped areas (WSDOT 2001).

This analysis reviews the changes resulting from the proposed action expressed in terms of whether it is likely to restore, maintain, or degrade functional chinook salmon habitat. By examining the effects of the proposed action on the habitat portion of a species' biological requirements, NOAA Fisheries can gauge how the action will affect the population variables that constitute the rest of a species' biological requirements and, finally the effect of the action on the species' current and future health.

The proposed project may directly affect chinook salmon in the following general ways:

1. By causing direct mortality and/or injury to fertile eggs, juveniles or adults. Equipment moving through the river and in-stream work can destroy eggs, cause mortality to alevins, or can physically damage juvenile and adult fish. Fuel spills into the river could be toxic to all fish life stages depending on exposure concentrations and durations.

2. In-stream construction over an extended period of time can delay or prevent breeding fishes from reaching acceptable spawning sites or can delay downstream movement of fry and young fish.

3. Degrading aquatic habitat over the short- and long-term. Short- and long-term habitat impacts occur with in-stream and floodplain work. Sediment stirred into the water column can be re-deposited on downstream habitats. Movement of large volumes of gravels and fines from head-cutting can be re-deposited on existing redds potentially destroying eggs and alevins. Subsidiary channels within the action area may be stranded by the head-cutting of the main channel. Long-term degradation of habitats can occur if the stream contours are modified in the area of the crossing, the flow patterns are changed, and if erosion of the bed, banks or adjacent upland areas introduces sediment into the stream that would not otherwise occur. Project-related effects to riparian zones (vegetation removal) may also cause impacts because of their intimate association with aquatic habitats.

4. Long-term benefits from the proposed action are expected with the removal of the north bank structure and south bank sheet pile. Continued presence of those structures could affect river channel development in the project area and downstream. With the removal of those elements, channel development would be expected to continue unhindered, restoring floodplain function through this reach.

2.1.3.1 Short-Term Construction-Related Direct Impacts

The HDDs could affect fish in the White River. Each HDD would extend for approximately 1,600 feet in the south floodplain and a minimum of 70 feet beneath the White River bottom. Use of HDD avoids impacts to waterbodies because it eliminates the need for in-stream excavation. However, drilling requires use of non-toxic bentonite clay for lubrication of the bit and removal of cuttings and because the drilling mud is under pressure, it is possible for bentonite to escape from the drill hole to the ground surface (called "frac-out") if the drill bit encounters substrate fractures or channels. If frac-out occurs under the White River, fish could be exposed to bentonite clay.

Bentonite in the White River could interfere with oxygen exchange by gills and the degree of interference generally increases with water temperature. This would be a localized, short-term effect, and if any impacts do occur they would be limited to individual fish in the vicinity of the leak. Fish move away from turbidity spots and plumes. Escaped bentonite could also have an effect on eggs and/or alevins in redds downstream from frac-out. That impact would also be short-term but could cause mortality to those life stages by suffocation. Spawning by chinook is expected to occur in the White River prior to completion of the 30-inch diameter HDD. The probability of frac-out near the White River is greatest when the drilling bit is working nearest the surface at the HDD entry and exit holes.

Northwest would excavate 750 to 850 feet of trench in the south floodplain for installation of the replacement pipelines. Work on the floodplain and other upland areas is not expected to have an adverse impact on in-stream habitats due to Northwest's implementation of sediment control practices (described in EA). Northwest will utilize an engineered trench design to minimize the trench width, creating a common trench to install both of the pipelines, and will minimize the typical centerline offset distances to 10-foot from the typical 20-foot offset. These measures will help minimize construction disturbance on the south floodplain.

The north bank structure was constructed to protect the pipelines from further exposure. This structure will no longer be needed and its removal is a component of the proposed action. Removal would allow the river to return to its natural alignment and restore floodplain function. The north bank structure has been causing scouring downstream leading to some loss of spawning habitat. There is some potential for sediment to be washed into the river from the removal of the rock, rootwads, and sand as the structure is disassembled.

During disassembly and removal of the north bank structure, part of the 325 feet of the existing pipelines present under the north bank structure would be cut and removed. Northwest intends to prevent water from the White River from entering the excavation trench with temporary berms as described in the EA. Potential escape of sediment into the river and hindrance of upstream fish movements during removal and re-contouring operations, if they occur, would be short-term impacts.

There is some potential for sediment to be washed into the river during removal of the 400 feet of metal sheet piling on the south river bank. Vibrations could cause silt to become dislodged from intergravel spaces and produce locally higher turbidity in the river. However, sediment control procedures and barriers used as part of the project would minimize this potential effect.

Vibrations produced during pipeline and sheet pile removal may temporarily interfere with adult salmon movement upstream. Vibrations caused by pipeline and sheet pile removal are not likely to affect eggs or alevins because excavation would be initiated and completed before those life stages are likely to be present.

Some minor in-stream excavation may be necessary to remove the previously abandoned 26-inch pipeline. This pipeline is now exposed across two active channels and imbedded in the gravel bar that separates the channels. The substrate would be disturbed by equipment and by the pipeline segment as it is removed. Currently, the exposed pipeline provides a function similar to LWD by creating a scour pool on it downstream edge. The pool may be providing a resting area for adults migrating upstream and is juvenile rearing habitat.

Adult chinook and other adult salmonids are expected to be present during the removal of the abandoned 26-inch pipeline. Additionally, some yearling chinook could be in the scour hole created by the pipeline downstream. However, removal will not coincide with spawning of any salmonid species. Chinook adult upstream migration in the White River could be disrupted over the short-term by removing this pipeline and juvenile rearing habitat would be eliminated. Generation of sediment during removal of this pipeline is also a potential short-term impact on fish and in-stream habitat. Even in a glacial system like the White River, substantial increases in fine sediment can have adverse effects on fish habitat. Evidence suggests that fish density is naturally lower in glacial systems than would be expected in clear water systems, indirectly resulting from sediment concentrations and duration (Newcombe and Jensen 1996). Activities that increase the loading of sediment can be so great as to indirectly influence productivity, cause changes in migratory behavior, reduce light penetration and the reactive distance of foraging fish, and reduce survival and emergence of alevin (Spence *et al.* 1996).

The amount of head-cutting that is expected to occur as a result of the 26-inch pipeline removal will affect the quality and extent of fish habitat. The head-cutting is expected to extend at least 800 to 1,000 feet upstream of the removed pipeline (Golder Associates, 2003). Golder Associates (2003) model showed a significant decrease in water surface elevations compared with the same flows in the existing conditions through this reach due to anticipated changes in channel profile. The majority of head-cutting is expected to occur within a relatively short period, pushed by seasonal rain-generated high flow events. The head-cutting could be expected to occur prior to, during, and after chinook spawning events. Movement of large volumes of gravel would be detrimental to both egg and alevin survival in redds occurring within the range of gravel transport downstream and head-cutting upstream. Additionally, Golder Associates (2003) predict the subsidiary channels within the zone of head-cutting may be stranded (perched). If this were to occur, future spawning and rearing within these channels would become severely impaired or lost (Russ Ladley, Puyallup Tribe, *pers. comm*).

The use of heavy equipment in the channel also has the potential to deliver pollutants through fuel spills or leaks. Northwest proposes to steam clean and inspect equipment to minimize potential adverse effects on water quality from fuel leaks and delivery of grease from dirty equipment operating in or near the water. This measure will help minimize the effects of the proposed action on chinook salmon. As a general matter, when pollutants (e.g., metals, Polyaromatic Hydrocarbons [PAHs] and other pollutants) enter streams, effects to fish can be direct through exposure to the chemical or indirect from increased biological or chemical oxygen demand. As a result, lethal or sublethal effects may occur (NRC 1996). While episodes of acute exposure are not expected, it is possible some juvenile chinook in the action area may be exposed to small amounts of pollutants (e.g., ionic copper, or PAHs) from the proposed action, which may increase susceptibility to infection and possibly predation (NRC 1996).

The proposed project will likely affect short-term and long-term migration and access of adult and juvenile fish through the White River. Northwest is removing a section of exposed pipeline that appears to be influencing sediment movement in the reach. In the short term, fish may avoid areas of increased human activity and habitat disturbance, and fish that migrate through the project area may be temporarily trapped around construction activities in and around the action area in this reach of the White River. The extent of adverse effects is minimized and compensation measures are included in the proposed action that intend to increase habitat suitability for salmonids. As discussed below, long-term river processes are expected to improve.

2.1.3.2 Long-Term Construction-Related Impacts

Smaller shade-producing trees and shrubs may be removed during construction. There are three sections along road improvement routes where some trees may be cleared. The first location is along the access road at “Turnout-2.” At this location, several small diameter conifers (less than ten-inches diameter at breast height - dbh) may need to be removed to accommodate large truck traffic. The second location is at “Turnout-3" where several small diameter conifers restrict the road width to less than twenty feet. The third location will require 3 cottonwood trees on the south side of the road to be removed to accommodate a twenty foot wide roadway. Until their regrowth following initial revegetation done according to Northwest’s “Riparian Mitigation Plan,” their removal would constitute a long-term affect (three to 10 years) to the riparian zone associated with chinook salmon habitat.

The abandoned pipeline has acted as a grade control structure in the river. At least 2.2 feet of head-cutting in the channel thalweg is expected to occur (Golder Associates, 2003). Most of the expected movement should occur within a relatively short-term, pushed by seasonal rain-generated high flow events. Flows in the range of 5,000 to 8,000 cubic feet per second (cfs) have a 50 to 80 percent probability of occurrence in any year, or an 88 to 99 percent probability of occurrence in three years. These flows are capable of and will probably cause significant channel degradation after the pipeline is removed. Flows greater than 12,500 cfs after the abandoned 26-inch pipeline is removed will overtop the existing island bar at the pipeline crossing with sufficient water depth to cause mobilization of the substrate layer of sediment, initiating head-cut erosion of the island (Golder Associates, 2003). Golder Associates (2003) predict in these larger events, the head-cut erosion could significantly modify the existing island and bars upstream of the pipeline crossing resulting in: (1) relocation of the primary channel; (2) reconfiguration of the gravel bar shape; (3) lateral erosion of the left and right banks along the channel corridor; and (4) significant downstream deposition of the eroded materials resulting in bar development, channel aggradation, and lateral channel movement. The 12,500 cfs event is the predicted six to eight year event, having a 50% chance of occurring in four to five years, or a 75% chance of occurring in eight to 10 years.

To help abate these affects, a number of key pieces of LWD would be placed within the channel and along the north and south banks. As defined in the EA, key pieces are those large enough or sufficiently shaped to remain fixed within high stream flows without anchoring with additional structures. Northwest proposes to install 15 to 16 key pieces along the main channel. Based upon Fox *et al.* (2003) a key piece size for the White River has a volume of at least 371 cubic feet and has an attached rootwad. Northwest also proposes to construct one or more log jam structures, each covering 5,000 square feet of channel or bank. Fox *et al.* (2003) suggest for a river the size of the White, engineered log jams should contain four to six key pieces (greater than 380 cubic feet each) and 200 wood pieces comprised of a diverse array of length and diameter to equal at least 3531 cubic feet (100 cubic meters) in total wood volume.

The addition of structural complexity may help minimize the loss of pool habitat, abate erosive forces on the raw bank areas, and retain some gravels. The LWD pieces are expected to shift as the channel shifts. The key pieces must have large root wads to increase stability of the wood, as well as provide habitat complexity important for juvenile chinook salmon. It is difficult to predict the overall effect that the project will have on the complex interactions that govern pool frequency and quality, and off-channel habitat formation and stability. Microhabitats will be in flux for at least the first few bank-full flow events. The retention of wood from the project site and replanting of the cleared areas will also help alleviate the potential affects of bank erosion.

The north bank will be restored according to Northwest's "North Bank Grading Plan," which implements restoration and monitoring measures in the White River according to the proposed Riparian Mitigation Plan. The implementation of conservation measures proposed in Northwest's Riparian Mitigation Plan would result in beneficial long-term impacts to salmonid habitat. The purpose of restoring the north bank is to reconnect the floodplain features upstream and downstream of the north bank structure in order to allow the floodplain in the project area to function in a manner similar to how it functioned prior to the installation of the structure. The White River would be able to flood at the pipeline crossing and resume natural channel processes in response to hydrologic events. These processes include lateral channel migration, gravel bar development and erosion, changes in vertical profiles of the channel and floodplain terraces, and migration movement of the channel thalweg.

Once the north bank structure and the sheet pile on the south bank have been removed, the White River would run unhindered through the project area, affecting channel morphology upstream and downstream of the project area. The White River has formed a braided channel possibly in response to exposure of the 26-inch pipeline. A large pool has developed immediately downstream of this pipeline. This pool provides holding habitat for pre-spawning adult chinook, as well as cooler rearing habitat for chinook juveniles. According to Northwest's Riverine Response Report, removal of this pipeline would result in head-cutting in the channel for a distance up to 1,000 feet upstream, and sediment deposition in the channel for over 400 feet downstream. The predicted head cutting could isolate adjacent side channels that are used by chinook for spawning and rearing.

To mitigate for this impact, FERC has agreed to three engineered log jams (ELJ's). Separately, Northwest proposes to collaborate with the Muckleshoot Indian Tribe (MIT) to determine whether additional LWD placement may be necessary to meet MIT's concerns. Northwest would work with MIT to calculate the exact number of key LWD and woody debris log jam structures to be used in off-site mitigation. Since the location of these key pieces is off Northwest's right-of-way, Northwest proposes to provide funds to the MIT to allow the tribe to place upstream and downstream LWD as would be necessary. The LWD structures would benefit chinook by providing habitat complexity for rearing. The LWD may keep the predicted head-cutting in check. This in turn would retain accessibility for chinook to adjacent side channels for spawning and rearing.

2.1.3.3 Indirect Effects

The pipeline replacement is to provide a permanent solution for improved safety and reliability. The action will not result in an increase in gas flow capacity. Development is not contingent upon the proposed project and therefore is not likely to contribute to any indirect effects of the proposed project. Indirect effects could include the temporary disruption of salmonid habitat and disturbance to the benthic invertebrate population at the project site during excavation and replacement of river substrate. These indirect effects would be temporary. Benthic invertebrates would reoccupy the area once excavation activities are complete and the substrate restored to its previous condition. Short-term increases in turbidity could reduce the foraging of salmon that are present in the vicinity of construction activities. If foraging habitat is reduced, it would be localized and of short duration. Golder Associates (2003) report that the increase in floodplain conveyance resulting from the removal of the north bank structure will cause water elevations to decrease slightly through the pipeline crossing reach. It is anticipated the pool created by the exposed 26-inch abandoned pipeline will fill in when this pipeline is removed. This pool serves chinook and other salmonids for rearing and as a holding area for returning adults.

Other potential indirect effects of the project's floodplain access roads to chinook include increased recreational demand, increased habitat degradation by human encroachment, increased water pollution, and potentially increased illegal harvest. Northwest must improve access along an existing gravel road leading to the south floodplain. The improved road could lead to these indirect effects on listed chinook and other salmonid species in the White River due to increased human access to the river, gravel bars and floodplain.

Indirect project effects may be beneficial in the long term since removal of the north bank structure, south bank sheet pile, and exposed abandoned 26-inch pipeline will allow channel processes to improve unhindered by existing constraints.

2.1.4 Cumulative Effects

Cumulative effects are defined as those effects of future state, tribal, local or private actions that are reasonably certain to occur within the action area considered in this Opinion (50 CFR.402.02). Future Federal actions, including the ongoing operation of the hydropower dams that are unrelated to the proposed action, are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

In general, activities and land uses within and affecting the action area range from rural and agricultural to dense urban development. While the cities of Buckley, Sumner, Tacoma, and Enumclaw are outside of the action area, their activities affect the quality of salmonid habitat within the action area. Perhaps the most important cumulative effect is the continued residential, urban, and industrial development of the White River watershed. Over the last 10 years, the Puget Sound lowlands have displayed a pattern of rapid urban expansion. The relatively short distance from the White River watershed to the major urban centers of Seattle and Tacoma inevitably lead to continued development in the area.

The Puget Sound Regional Council predicts that between 1998 and 2030 there will be a 37% increase in population in the lower White River Watershed (excluding Tacoma) increasing from 210,000 in 1998 to 330,000 in 2030 (PSRC 2001). Expected effects of development include those that directly affect the White River itself and those that affect the watershed. Changes to the river and the watershed affect the capacity of the White River to meet the biological requirements of chinook salmon. For instance, the White River currently receives sewage treatment effluent from the cities of Enumclaw, Buckley, and Sumner. The Buckley and Enumclaw treatment plants discharge directly into the bypassed reach. The predicted population increase in these cities of 20% between 1998 and 2030 (PSRC 2001) will likely cause increased load on the sewage plants, depending on the conditions of the water quality permits that control those discharges. The reduced flows of the bypassed reach are unlikely to absorb this increased load without degrading of water quality.

In addition to increased demand for water to dilute and carry away wastes, increased demand for consumption is possible. Modifications to the watershed associated with development including paving, increased drainage network, loss of forest and riparian vegetation, and road building are associated with increased non-point source pollution, sedimentation, increased water temperatures, and reduced flows. The likely effects of continuing development of the watershed could have deleterious effects on Puget Sound chinook due to degraded water quality, specifically increased water temperatures and decreased dissolved oxygen, and with reduced flows. Reductions in flows could delay migration of pre-spawners and juveniles.

2.1.5 Integration and Synthesis of Effects

Northwest's pipeline protection measures installed in 1996 (north bank structure) and in 1999 (south bank sheet piling) have degraded salmonid habitat and floodplain connectivity within this reach of the river, affecting channel development important to chinook spawning and rearing habitats. Removal of the north bank structure and south bank sheet pile will cause temporary construction effects on chinook salmon and their habitat. The abandoned 26-inch pipeline acts as a grade control. Removing this abandoned pipeline will change the channel morphology during and after construction. The intensity of habitat changes would lessen over time, including: lethal to sublethal exposure to changes in water quality during construction; potentially persistent sources of surface erosion for years following construction (see discussion above in sections 2.1.3.1 and 2.1.3.2); and major changes in sediment transport (head-cutting) affecting about one-quarter mile of chinook salmon spawning and rearing habitat. Within the zone most affected by sediment transport resulting from this project, harm to spawning habitat and redds is likely to be substantial to the White River chinook in that section of the river. Bedload changes are expected to occur within the first few bank-full flow events. Until equilibrium is achieved in bed movement, success of developing eggs, embryos, and alevins through the area could be substantially affected by direct burial or through redd scour. NOAA Fisheries expects the amount of mortality will diminish with each subsequent flood season as the river's bed load adjusts to local forces and tends to stabilize.

Head-cutting may also strand subsidiary channels within the action area. Should this occur, known chinook spawning and rearing within these channel habitats would be lost (Russ Ladley, Puyallup Indian Tribe, *pers. comm.*, November 2003). It is possible new channels may subsequently form and could serve similar functions for chinook.

During construction activities, returning adult White River chinook salmon would be exposed to temporary conditions resulting from Northwest's project as they migrate through the project area. Inwater work activities and the temporary bridge may halt upstream movement and cause adults to crowd. Adults waiting in the pool created by the abandoned 26-inch pipeline could be adversely affected. Fish in the construction area could be exposed to sublethal stressors resulting from the presence of heavy equipment and laborers. Depending on exposure to the expected sediment load and other stressors, impacts on some fish may occur in addition to stressors at the Buckley trap. However, adults are not likely to die as a result of exposure to activities at the construction site, or later as a result of exposure to successive stressors. A portion of the fish that are encountered in the project area would be juvenile chinook salmon. Some of these juvenile chinook may utilize and be displaced from the large pool formed by the 26-inch pipeline, because the pool is expected to disappear once this pipeline is removed. The number of juvenile chinook displaced would be relatively low because the vast majority are believed to emigrate as young of the year in the spring.

While the effects of construction would likely adversely affect fish and fish habitat, the long-term effects will benefit fish and thus outweigh short-term disturbances and take resulting from Northwest's pipeline replacement project, especially when considering the conservation elements of the proposed action. Removal of the north bank structure and south bank sheet pile will allow the river to flood naturally through this reach. Floods play an important role in shaping stream channels through the erosion, transport, and deposition of bed materials. Natural channel movement is important process that can result in added large woody debris and replenish river-bed gravels, a necessary substrate for chinook salmon spawning.

2.1.6 Conclusion

After reviewing the current status of threatened PS chinook salmon, the environmental baseline for the action area, the effects of the proposed project, and the cumulative effects, it is NOAA Fisheries' biological opinion that Northwest's pipeline replacement project is not likely to jeopardize the continued existence of the PS chinook salmon ESU.

2.1.7 Reinitiation of Consultation

Consultation must be reinitiated if the amount or extent of take specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; new information reveals effects of the action may affect listed species in a way not previously considered; the action is modified in a way that causes an effect on listed species that was not previously considered; or, a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16). If minimization measures or habitat enhancement measures described as part of the project and in this Opinion are not completed, or through monitoring shown to be ineffective then this would constitute new information that could effect the listed species in a way not previously considered, and may require that the FERC reinitiate consultation.

2.2 Incidental Take Statement

The ESA at section 9 [16 U.S.C. 1538] prohibits take of endangered species. The prohibition of take is extended to threatened anadromous salmonids by section 4(d) rule [50 CFR 223.203]. Take is defined by the statute as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" [16 U.S.C. 1532(19)]. Harm is defined by regulation as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering" [50 CFR 222.102]. Incidental take is defined as "takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant" [50 CFR 402.02]. The ESA at section 7(o)(2) removes the prohibition from any incidental taking that is in compliance with the terms and conditions specified in a section 7(b)(4) incidental take statement [16 U.S.C. 1536].

An incidental take statement specifies the extent of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize take and sets forth terms and conditions with which the action agency must comply to implement the reasonable and prudent measures.

2.2.1 Amount or Extent of Anticipated Take

Juvenile and adult PS chinook salmon are expected to use the action area and the project area throughout the duration of construction. As stated previously, the project would occur during the upstream migration of adult White River chinook salmon prior to spawning. However, both immediate short-term, and latent intermediate- to long-term direct and indirect effects of the project are expected in the area. This area, known as the Reservation Reach, is used by White River chinook for spawning, incubation, and rearing. Therefore, take of PS chinook is reasonably certain to occur.

Take caused by the proposed action is anticipated in the form of harm, where habitat modification will kill or injure chinook by significantly impairing essential behavioral patterns, including spawning, migration, feeding, sheltering, and rearing. Harm is likely to result from injury from work site activities, changes in sediment transport, and smothering of spawning and rearing habitat by introduced sediments. The greatest potential for take would result from changes in the channel profile (head-cutting) that may directly impact fertilized eggs and alevins (spawning success) and indirectly may limit access to existing spawning and rearing areas (abandoned channels).

While there is a general idea of where the spawning would occur, and that adult and some juvenile fish would be in the reach as the project is constructed, NOAA Fisheries cannot estimate the amount of take of individual fish because the exact numbers that would be present are unknown. Therefore, NOAA Fisheries describes the extent of take of PS chinook salmon as the specific area of White River affected by the construction and channel head-cutting up to the point at which the side channels (described in Golder Associates, 2003) are altered to become impassable by juvenile PS chinook. Head-cutting that progresses so far as to entirely disconnect the channels from the mainstem of the White River would constitute a major loss of functioning spawning and rearing habitat. This potential event is outside the scope of take allowed, and therefore not covered by this incidental take statement.

NOAA Fisheries expects most if not all chinook eggs deposited in redds in the White River between RM 10 and 11 would be killed by the proposed action during high flow events of the first two to three years. This estimate is based on the expected extent of affects from channel regrading (head-cutting), which would affect the spawning and incubation success of chinook salmon in this reach. The extent of eggs and embryos harmed through major channel changes would diminish with time and high flow events, but as a worst case, harm may persist at reduced levels for three to 10 years based on an estimate of probability of channel forming events by Golder Associates.

2.2.2 Reasonable and Prudent Measures

The reasonable and prudent measures described below are necessary and appropriate to minimize amount or extent incidental take of PS chinook salmon resulting from this project. These measures are non-discretionary and must be binding conditions of FERC's permit in order for the exemption in section 7(a)(2) to apply. The FERC has the continuing duty to regulate the activities covered in this incidental take statement. If the FERC fails to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

The FERC shall ensure that Northwest:

1. Minimizes take of chinook salmon trapped within the construction area or migrating through the action area during construction activities.

2. Minimizes take of chinook salmon from changes in habitat access, riparian vegetation and LWD, pool presence, substrate, and other indicators of functional chinook habitat in the White River and side channels.

2.2.3 Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the FERC and Northwest must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. To implement Reasonable and Prudent Measure No. 1, the FERC will ensure that:

    a. Timing of inwater work is scheduled to minimize adverse effects of construction. Work below bank-full elevation[2] will be completed between June 16 and August 30, unless otherwise approved in writing by NOAA Fisheries. Work on the inwater aspects of this project each day shall not begin before 9:00 a.m., or go later than 6:00 p.m. This daily timing of work is to allow for the majority of adult passage to occur during non working hours.

    b. Fish passage will provide for any adult or juvenile salmonid species present in the project area during inwater construction. At least three 30-minute breaks from activity related to pipeline, sheet pile and north bank structure removal, will occur each day. In lieu of these breaks, Northwest could opt to monitor the pools in the White River within one-quarter mile downstream of the construction site by a qualified salmon biologist. If in the opinion of the biologist, returning adult chinook salmon are holding in the pools at too great a number, all inwater and shoreline activity shall cease to allow adults to pass. The work stoppage will last for 30 minutes. Northwest shall notify NOAA Fisheries if dead or distressed salmonids are observed. Notification should be to the Washington State Habitat Office at (360) 753-9530.

    c. Confine construction impacts to the minimum area necessary to complete the project.

    d. Cease project operations under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage.

    e. Northwest shall maintain water quality by committing to the following provisions: (1) all heavy construction equipment must be clean prior to operation in or near the White River and associated wetlands; (2) hydraulic machinery shall use non-toxic hydraulic fluids when operated in or near the White River and associated wetlands; (3) all refueling areas will be located in a previously approved location or otherwise 300 feet or more from all sensitive aquatic areas, including the White River and associated wetlands; and (4) refueling areas must be diked and lined to prevent spillage into sensitive areas.

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[2] "Bankfull elevation" means the bank height inundated by a 1.5- to 2-year average recurrence interval and may be estimated by morphological features such as average bank height, scour lines and vegetation limits.

2. To implement Reasonable and Prudent Measure No. 2, the FERC will ensure that:

a. Barrier fences are installed along the clearing limits to delineate protected areas. Fences must be located outside of the drip line of any mature trees to be retained on site.

b. Where disturbance or vegetation removal is necessary, then Northwest will ensure that trees are pushed over or dug-out to retain as much of the root structure as possible. Trees greater than 8 inches and longer than 36 feet will be distributed as follows: Two-thirds of the wood will be distributed as proposed in the BA, and one-third will be distributed within 50 feet of the banks to be recruited over time as shifts in the channel occur.

c. All discharge water created by construction will be treated as follows:

i. Design, build and maintain facilities to collect and treat all construction discharge water, including any contaminated water produced by drilling, using the best available technology applicable to site conditions. Provide treatment to remove debris, nutrients, sediment, petroleum hydrocarbons, metals and other pollutants likely to be present.

ii. If construction discharge water is released using an outfall or diffuser port, velocities may not exceed 4 feet per second, and the maximum size of any aperture may not exceed one inch.

d. The following actions will be completed before any ground disturbing activities in the project area.

i. Flag the boundaries of clearing limits associated with site access and construction to prevent ground disturbance of riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.

ii. Ensure that the following materials for emergency erosion control are onsite.

1) A supply of sediment control materials (e.g., silt fence, straw bales[3]).

2) An oil-absorbing, floating boom.

iii. All temporary erosion controls will be in place and appropriately installed downslope of project activity within the riparian area until site restoration is complete.

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[3] When available, certified weed-free straw or hay bales will be used to prevent introduction of noxious weeds.

e. Soil disturbance and compaction will be minimized whenever a new temporary road or drill pad is necessary within 150 feet of the White River, side channel or wetland by clearing vegetation to ground level and placing glean gravel over geotextile fabric, unless otherwise approved in writing from NOAA Fisheries. When the project is complete, obliterate all temporary access roads, stabilize the soil, and revegetate the site. Abandon and restore temporary roads in wet or flood prone areas by the end of the inwater work period.

f. If planted areas are not meeting performance criteria for vegetation growth, the monitoring and replacement regime will be continued for another 5 years, or until performance criteria are met.

g. All LWD in the construction area shall be inventoried, collected, and returned to the site following construction activities.

h. The three ELJ's, having four to six key pieces and no less than four rack members, shall be installed to abate expected gravel movement from head-cutting, and to create new pools and channels.

i. Northwest must use bioengineering bank stabilization techniques to restore the White River shore. Native rock, removed from trenching, may be placed along the banks and floodplain. Final bank stabilization must provide stability for riparian mitigation to take hold, but must not be designed to prevent a range of natural channel changes over time.

j. Northwest develops and implements plans in cooperation with NOAA Fisheries for monitoring the effectiveness of the ELJs and long-term changes in channel profile associated with expected head-cutting of the channel upon removal of the 26-inch pipeline. A set of transects of the White River channel must be taken before construction begins. Monitoring of the White River will continue until it is determined head-cutting has ceased, or up to 10 years, whichever is greater.

k. Pool habitat and side channel condition shall be monitored upstream and downstream of the crossing to determine the short and long-term effects of the project.

l. If monitoring shows side channels are becoming abandoned by annual surface flow due to head-cutting, and the ELJs are not effective in creating new pools and channels, the FERC shall reinitiate consultation with NOAA Fisheries if additional Incidental Take permission is sought.

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION MANAGEMENT ACT

3.1 Background

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (section 305(b)(2));

- NOAA Fisheries must provide conservation recommendations for any Federal or state activity that may adversely affect EFH (section 305(b)(4)(A));

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the effect of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency must explain its reasons for not following the recommendations (section 305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA section 3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.110). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NOAA Fisheries is required by Federal agencies regarding any activity that may adversely affect EFH, regardless of its location.

The objective of this EFH consultation is to determine whether the proposed action may adversely affect designated EFH, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse impacts to EFH resulting from the proposed action.

3.2 Identification of Essential Fish Habitat

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Federally-managed Pacific salmon: chinook; coho (*O. kisutch*); and PS pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of the impacts to these species' EFH from the proposed action is based on these descriptions and information provided by the FERC.

3.3 Proposed Actions

The proposed action is detailed above in *Section 1.0* of this document. The proposed project will affect EFH for various life-stages of chinook, coho, and PS pink salmon from RM 11.2 to 10.4 of the White River. The area affected extends upslope at the construction site incorporating portions of the floodplain on both the north and south banks.

3.4 Effects of Proposed Actions

As described in *Section 2.1.3* these activities may result in detrimental, as well as beneficial, short- and long-term effects on the designated EFH for Pacific salmon. The proposed project would adversely affect spawning and incubation habitat, while improving floodplain function and other essential features of Pacific salmon habitat. The action would:

1. Result in short-term effects that include changes in channel gradient, suspended sediment concentrations, and hydraulic complexity. Long-term effects may include changes in hydraulic complexity and the longitudinal profile in the White River.

2. Affect sediment transport which may in turn adversely affect water quality, spawning and incubation success, the distribution of habitat elements including pool frequency and quality, and side channel habitat.

3. Affect LWD and riparian vegetation within the project area through construction activities and indirectly as the channel reestablishes equilibrium.

4. Affect streambank condition through construction activities and indirectly as the channel reestablishes equilibrium.

5. Adversely affect water quality during construction activities through chemical contamination and changes in suspended sediment concentrations.

3.5 Conclusion

NOAA Fisheries believes that the proposed action may adversely affect designated EFH for Pacific salmon.

3.6 Essential Fish Habitat Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions which may adversely affect EFH. While NOAA Fisheries acknowledges that the conservation measures described in the biological opinion will be implemented by the FERC, it does not believe that these measures are sufficient to address the adverse impacts to EFH described above. Consequently, NOAA Fisheries has the following EFH conservation recommendations that, if implemented, will minimize the potential adverse impacts of the proposed project and conserve EFH:

1. To minimize adverse effects No. 1 (short and long term effects on access), the FERC should implement the following:
   a. In consultation with NOAA Fisheries and the Tribes, install additional LWD jams to minimize channel shifts that may degrade access and pool frequency.
   b. Evaluate and repair habitat access if it becomes degraded from shifts in channel profile.
   c. Minimize adverse increases in suspended sediment levels resulting from project activities.

2. To minimize adverse effects No. 2 and 3 (effects sediment transport, water quality, pool frequency and quality, side channel habitat, LWD and riparian vegetation) the FERC should:
   a. Ensure large trees are pushed over or dug-out and retained on site, with as much of the root structure as possible.
   b. Inventory and retain all LWD on site.
   c. Ensure LWD jams are installed, and supplemented with additional wood.
   d. Install barrier fences along the clearing limits to delineate protected area. Fences should be located outside of the drip line of any mature trees to be retained on site.
3. To minimize adverse effects No. 4 (streambank condition) the FERC should:
   a. Use bioengineering bank stabilization techniques to restore the White River shore.
   b. Place native rock, removed from the trench, along the banks and floodplain.

4. To minimize adverse effects No. 5 (water quality), the FERC should:
    a. Ensure that water quality is monitored at all discharge points, and above and below the project area.

3.7 Statutory Response Requirement

Pursuant to the MSA (section 305(b)(4)(B)) and 50 CFR 600.920(j), Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity. In the case of a response that is inconsistent with the EFH Conservation Recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

The FERC must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920(l)).

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